

## Claims

1. A method for operating a system-resource-based multi-modal input fusion, the method comprising the steps of:

- 5       receiving a plurality of user inputs;  
           determining an amount of system resources available; and  
           creating sets of similar user inputs, wherein a number of similar user inputs within a set is based on the amount of system resources available.

10   2. The method of claim 1 further comprising the steps of:

          converting the plurality of user inputs into Typed Feature Structures (TFSs); and

- wherein the step of creating sets of similar user inputs comprises the step of creating sets of similar TFSs, wherein the number of TFSs within a set is based  
 15   on the amount of system resources available.

3. The method of claim 2 wherein the step of converting the plurality of user inputs into Typed Feature Structures comprises the step of converting the plurality of user inputs into a plurality of attribute value pairs and confidence scores.

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4. The method of claim 2 wherein the step of creating sets of similar TFSs comprises the step of creating sets of similar TFSs, wherein a TFS is included in a set if it has a content score greater than a threshold, wherein

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$$\text{ContentScore(TFS)} = f(N, N_A, N_R, N_M, \text{CS}(i)|_{i=1}^N),$$

where

$N$  = number of attributes in TFS,

30    $N_A$  = number of attributes in TFS having a value,

$N_R$  = number of attributes in TFS with redundant values,

$N_M$  = number of attributes in TFS with missing explicit reference, and

$\text{CS}(i)$  = confidence score of the  $i^{\text{th}}$  attribute of TFS.

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5. The method of claim 2 wherein the step of creating sets of similar TFSs comprises the step of creating sets of similar TFSs, wherein a TFS is included in a set if it has a context score greater than a threshold.

- 5 6. The method of claim 5 wherein the step of creating sets of similar TFSs comprises the step of creating sets of similar TFSs, wherein a TFS is included in a set if it has a context score greater than a threshold wherein

$$\text{ContextScore(TFS)} = h(D_m, \text{RS(TFS, TFS}_m))$$

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where

$D_m$  = number of turns elapsed since receiving  $\text{TFS}_m$  from a modality

RS = Relationship Score between TFS (current input) and  $\text{TFS}_m$

- 15  $\text{TFS}_m$  = a TFS received  $D_m$  turns ago.

7. The method of claim 1 wherein a number of sets created is based on the amount of system resources available.

- 20 8. The method of claim 1 wherein the step of receiving the plurality of user inputs comprises the step of receiving a plurality of multi-modal user inputs.

9. The method of claim 1 wherein the step of determining the amount of system resources available comprises the step of determining an amount of memory or  
25 processing power available.

10. The method of claim 1 wherein the step of creating sets of similar user inputs comprises the step of creating sets of similar user inputs, wherein a user input is included in a set if it has a content score greater than a threshold.

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11. A method for operating a system-resource-based multi-modal input fusion, the method comprising the steps of:

receiving a plurality of user inputs;

determining an amount of system resources available; and

creating sets of similar user inputs, wherein a number of similar user inputs within a set is based on the amount of system resources available, and wherein a number of sets created is limited based on the amount of system resources available.

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12. The method of claim 11 further comprising the steps of:

converting the plurality of user inputs into Typed Feature Structures (TFSs); and

10 wherein the step of creating sets of similar user inputs comprises the step of creating sets of similar TFSs, wherein the number of TFSs within a set is based on the amount of system resources available.

13. The method of claim 12 wherein the step of converting the plurality of user inputs into Typed Feature Structures comprises the step of converting the plurality  
15 of user inputs into a plurality of attribute value pairs and confidence scores.

14. The method of claim 11 wherein the step of receiving the plurality of user inputs comprises the step of receiving a plurality of multi-modal user inputs.

20 15. The method of claim 11 wherein the step of determining the amount of system resources available comprises the step of determining an amount of memory or processing power available.

16. An apparatus comprising:

25 a plurality of modality recognizers receiving a plurality of user inputs; and  
a semantic classifier determining an amount of system resources available and creating sets of similar user inputs, wherein a number of user inputs within a set is based on the amount of system resources available.

30 17. The apparatus of claim 16 further comprising:

segmentation circuitry converting the plurality of user inputs into a plurality of Typed Feature Structures (TFSs); and

wherein the semantic classifier creates sets of similar TFSs, wherein the number of TFSs within a set is based on the amount of system resources available.

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18. The apparatus of claim 17 wherein the number of sets created is limited based on the amount of system resources available.

19. The apparatus of claim 16 wherein the number of sets created is limited based  
5 on the amount of system resources available.